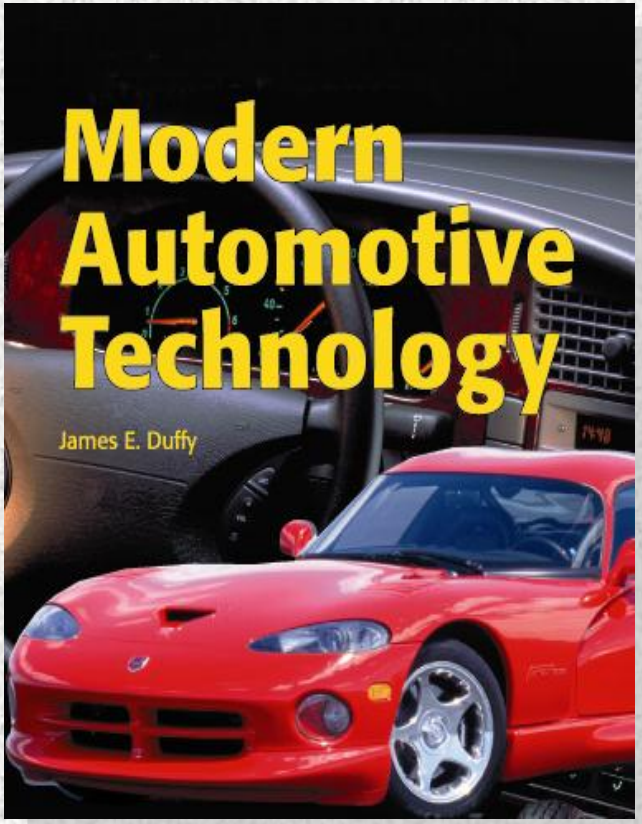
PowerPoint for

Modern Automotive Technology

by

Russell Krick



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Chapter 5

The Auto Shop and Safety

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Contents

- Auto shop layout
- Shop safety
- Types of accidents
- General safety rules

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Safety

If basic safety rules are followed, an auto shop can be a safe and enjoyable place to work

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Auto Shop Layout

- There are several different areas in an auto shop
- These areas include:
  - repair area
  - toolroom
  - classroom
  - locker room

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Repair Area

- Includes any location in the shop where repair operations are performed
- Normally includes every area except the classroom, locker room, and toolroom

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Shop Stall

- Small work area where a car can be parked for repairs
- Sometimes, each stall is numbered and marked off with lines painted on the floor

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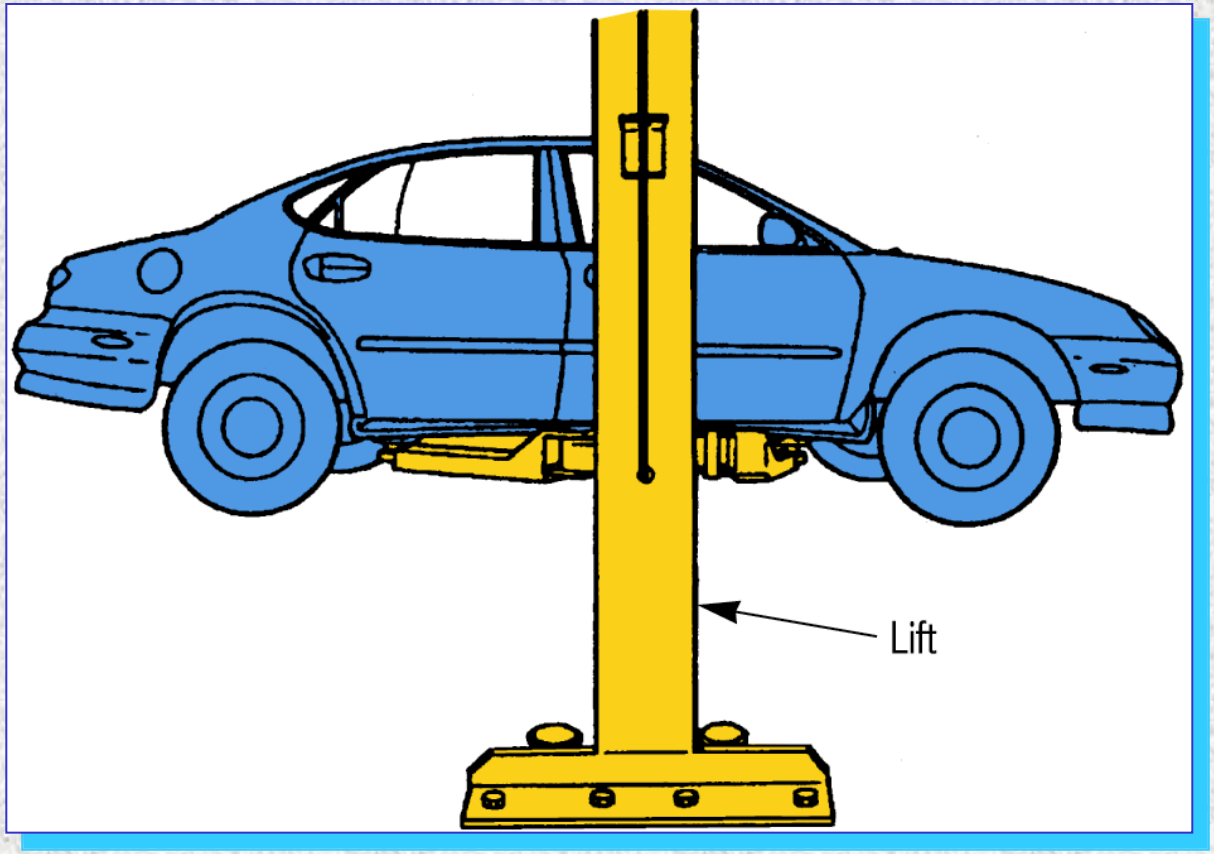
Lift



Used to raise a vehicle–useful when working under the car

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Lift Safety Rules

- Ask your instructor for a demonstration and get permission before using the lift
- Center the vehicle on the lift, using the lifting points described in the service manual
- Check ceiling clearance before raising trucks and campers

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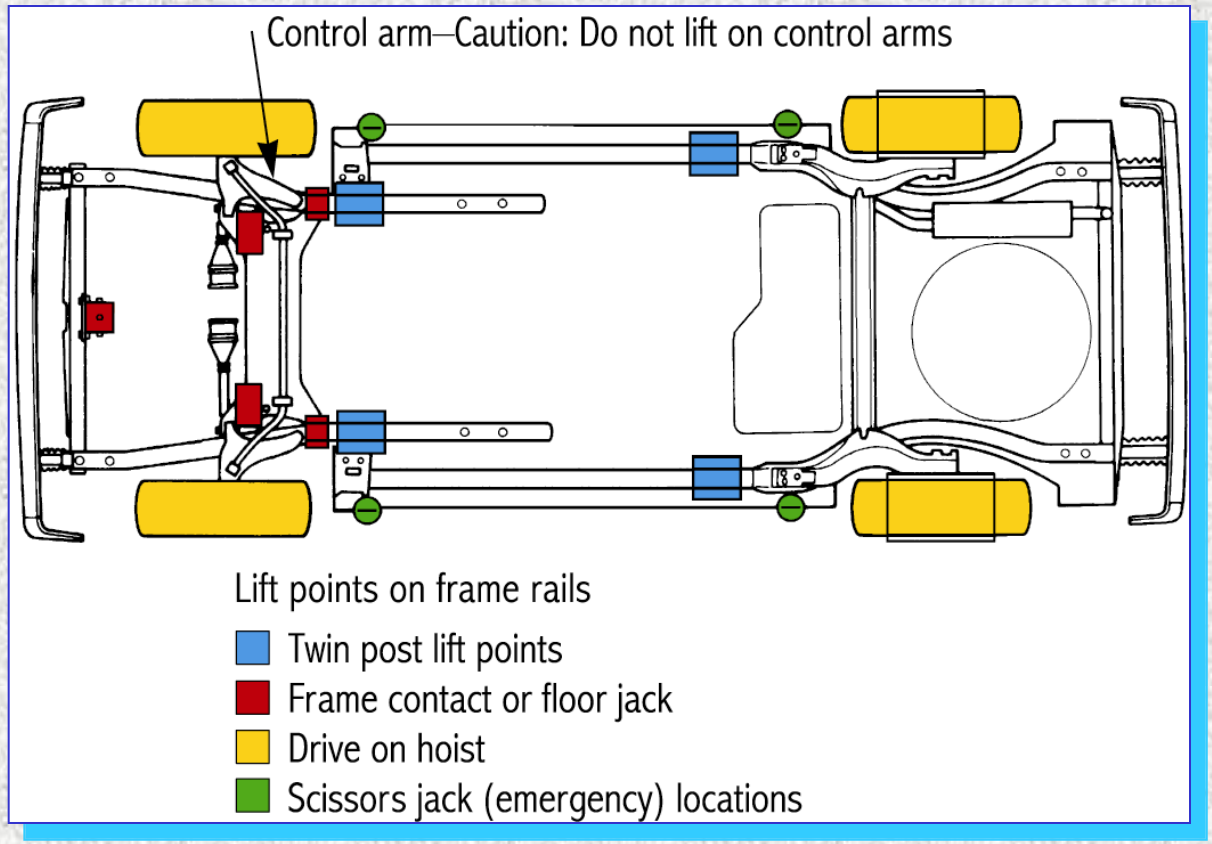
Lifting Points


Control arm—Caution: Do not lift on control arms
Lift points on frame rails
Twin post lift points
Frame contact or floor jack
Drive on hoist
Scissors jack (emergency) locations

Recommended lifting points for a specific vehicle

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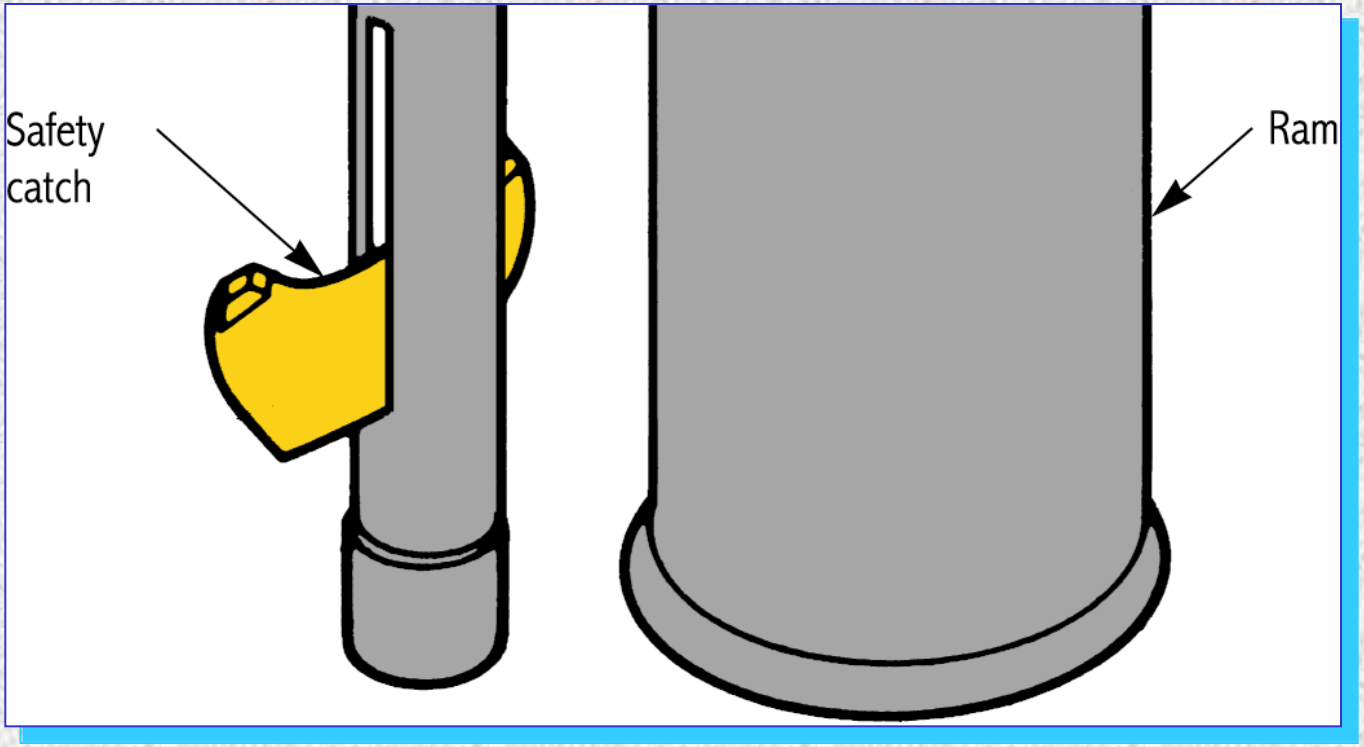
Safety Catch



Make sure the lift's safety catch is engaged before working under the vehicle

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This is the safety catch on our lifts. Can can not see the latch that locks into these blocks.

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Alignment Rack

Specialized stall used when working on steering and suspension systems

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Alignment Rack

- When using a rack, the car should be pulled on the rack slowly and carefully
- Someone should guide the driver and help keep the tires centered on the rack
- Obtain a full demonstration before using the alignment rack

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Outside Work Area

- Some shops have an outside work area
- In good weather, this area can be used for auto repairs
- Always raise the shop doors all the way and pull cars through the doors very slowly
- Check the height of trucks and campers to make sure they will clear

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Toolroom

- Shop area normally adjacent to the main shop or classroom
- Used to store shop tools, small equipment, and supplies
- When working in the toolroom, you must keep track of shop tools
- Every tool checked out must be recorded and called in before the end of the class period

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Toolroom

Keep all shop tools clean and organized

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Classroom

- Used for seminars, demonstrations, and other technician training activities
- May also be used for employee meetings

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Locker Room

- Usually located adjacent to the main shop
- Provides an area for changing into your work clothes
- Always do your part to keep the locker room clean and orderly

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Shop Safety

- Every year, thousands of technicians are accidentally injured or killed on the job
- Most of these accidents resulted from a broken safety rule
- While working, constantly think of safety

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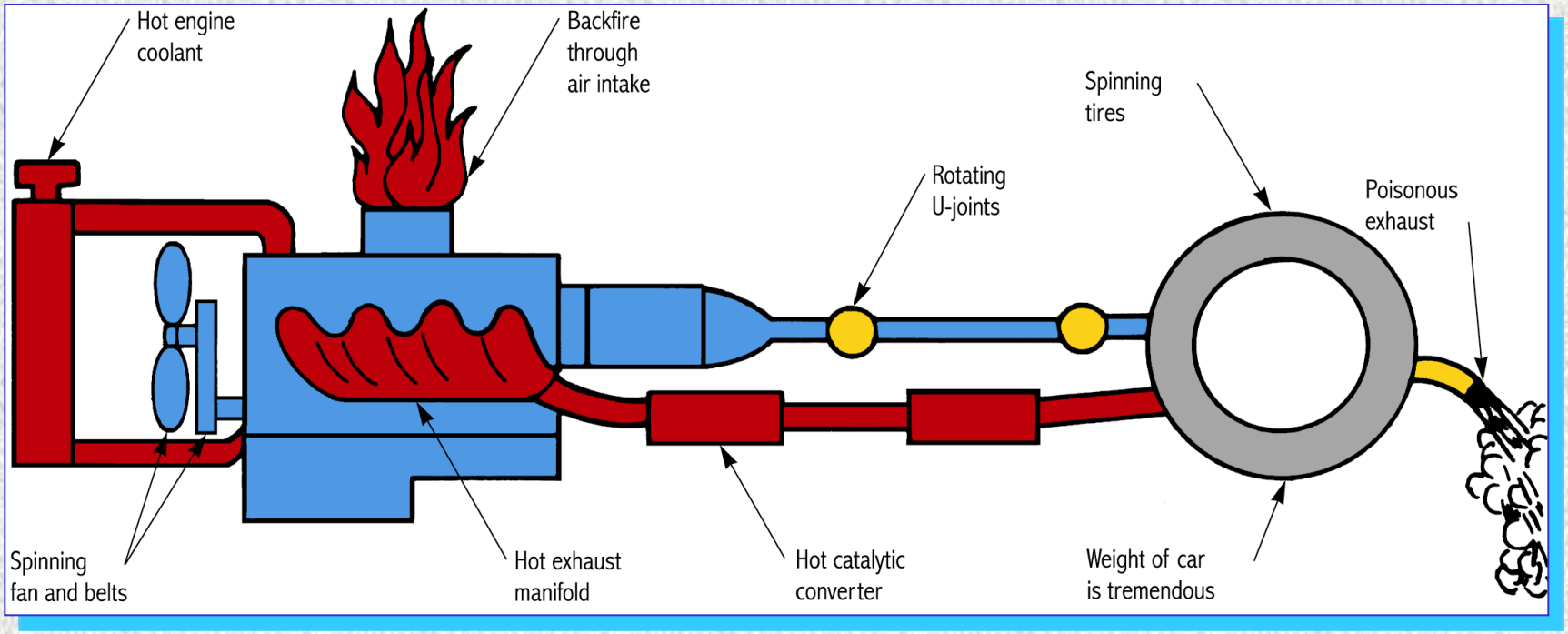
Potential Dangers



Just a few of the dangers present around an automobile

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Types of Accidents

- Be aware of and try to prevent six kinds of accidents:
  - fires
  - explosions
  - asphyxiation
  - chemical burns
  - electric shock
  - physical injuries

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Plan Your Actions

- If an accident or injury occurs in the shop, notify your instructor immediately
- Use common sense when deciding whether to get a fire extinguisher or to take other actions

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Fires

- Terrible accidents capable of causing severe injury and permanent scar tissue
- Every precaution must be taken to prevent fires
- There are numerous combustible substances found in the shop:
  - gasoline
  - oily rags
  - paints and thinners

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Gasoline Safety Rules

- Store gasoline and other flammables in approved, sealed containers
- When disconnecting a fuel line or hose, wrap a shop rag around the fitting
- Disconnect the battery before working on a fuel system

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Gasoline Safety Rules

- Wipe up gasoline spills immediately
- Keep any source of heat away from fuel system parts
- Never use gasoline as a cleaning solvent

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Storage of Combustibles

- Soiled rags should be stored in an approved safety can
- Paints, thinners, and other combustibles should be stored in a fire cabinet
- Never set flammables near a source of sparks, flames, or heat
- Note the location of all fire extinguishers in your shop

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Electrical Fires

- Result when a current carrying wire touches ground
- Wire can heat up, melt the insulation, and burn
- Other wires can then do the same
- To prevent electrical fires, always disconnect the battery when instructed to do so in a service manual

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Explosions

- Rapid, almost instant, combustion of a material that causes a powerful shock wave to travel through the shop
- There are several potential causes of explosion in the shop:
  - hydrogen gas emitted by batteries
  - fuel tanks or containers
  - sodium-filled engine valves
  - welding tanks and propane bottles

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Asphyxiation

- Caused by breathing toxic or poisonous substances
- Causes dizziness, headaches, vomiting, and even death
- Automobile exhaust gases cause most cases of asphyxiation in automotive shops

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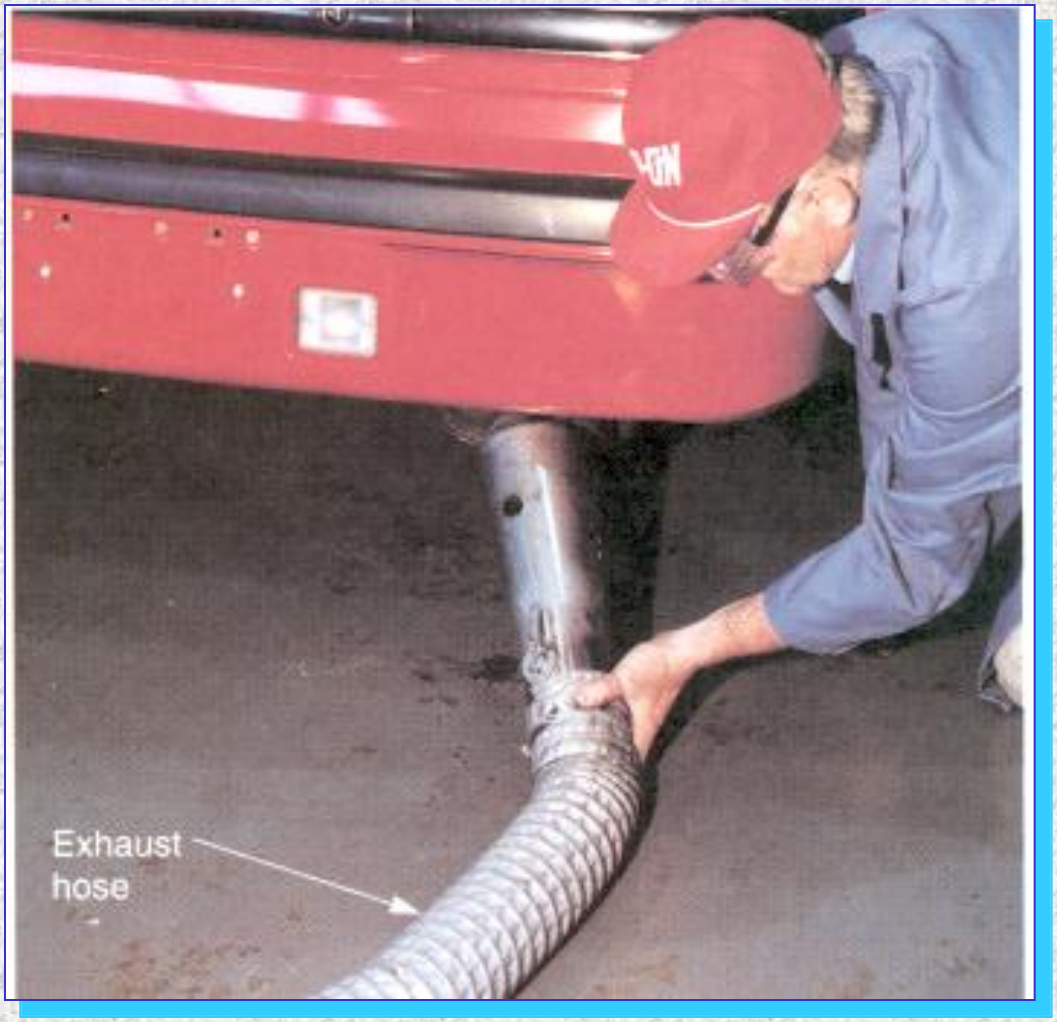
Asphyxiation

Place an exhaust hose over the tailpipe of any car running in an enclosed shop



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Harmful Substances

- Other shop substances are harmful if inhaled
- These substances include:
  - asbestos dust from brake or clutch linings
  - parts cleaners
  - paint spray

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Harmful Substances

This technician is wearing a respirator for protection from toxic welding fumes

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Chemical Burns

- Solvents, battery acid, and various other shop substances can cause chemical burns
- Always read the directions on all chemical containers
- Wear proper protective gear when handling solvents and other caustic materials

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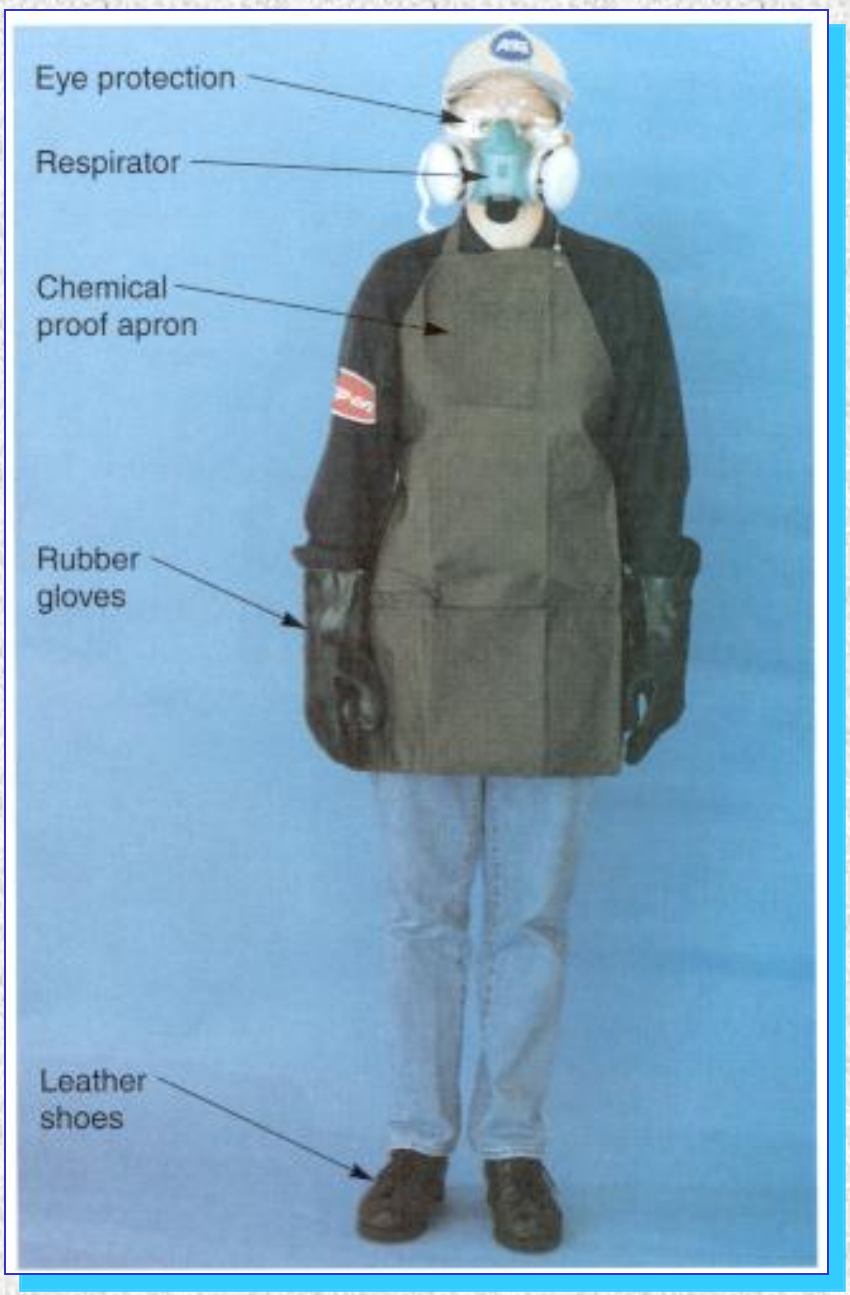
Chemical Burns

Protective gear for preventing chemical burns



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Carburetor Cleaner

- Very powerful decarbonizing product that can severely burn your skin in a matter of seconds
- Wear rubber gloves when using carburetor cleaner

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Electric Shock

- Result of electric current passing through parts of your body, causing injury or death
- Can occur when using improperly grounded electric power tools
- Never use an electric tool unless it has a third round prong on the plug socket
- Never use an electric tool on a wet shop floor

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Physical Injuries

- Can result from hundreds of different accidents
- You must evaluate every repair technique
- Decide whether a particular operation is safe and take action as required
  - e.g. if you are pulling on a wrench as hard as you can and the bolt will not turn, **stop**, and find another wrench that is larger

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General Safety Rules

There are several general safety rules that should be followed at all times

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Safety Rules

- Wear eye protection during any operation that could endanger your eyes
- Avoid anyone who does not take shop work seriously
- Keep your shop organized
- Dress in an appropriate manner

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Safety Rules

- Never carry sharp tools or parts in your pockets
- Wear full face protection when grinding, welding, or performing other hazardous operations
- Work like a professional
- Use the right tool for the job

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Safety Rules

- Keep guards or shields in place
- Lift with your legs, not your back
- Use adequate lighting
- Ventilate when needed
- Never stir up asbestos dust
  - asbestos is a carcinogen
  - do not blow dust from brake or clutch parts

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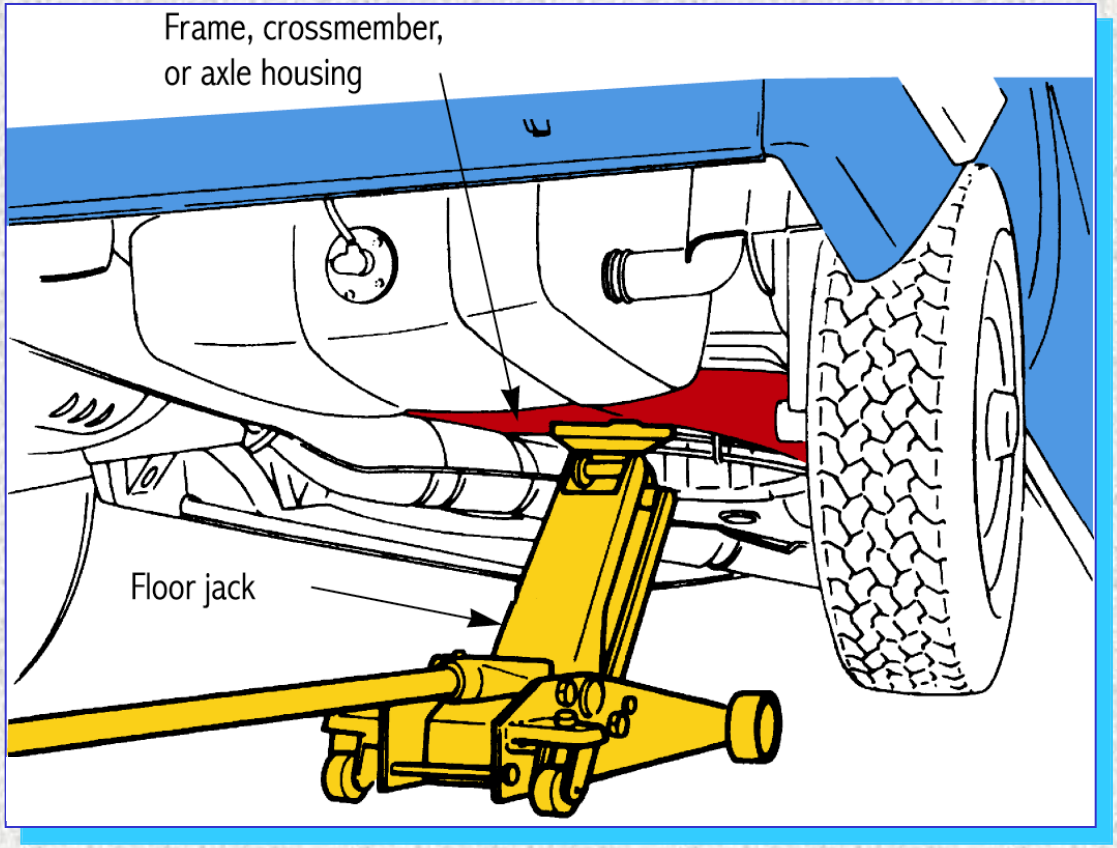
Safety Rules



Jack up a vehicle slowly and safely

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Safety Rules

Never work on a vehicle not supported by jack stands

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Safety Rules

- Drive slowly when in the shop area
- Report unsafe conditions to your instructor
- Stay away from engine fans
- Respect running engines
  - make sure the transmission is in park or neutral, the parking brake is set, and the wheels are blocked

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Safety Rules

- Do not smoke in the auto shop
- Read material safety data sheets when in doubt about any dangers
- Obtain instructor permission before using any new or unfamiliar power tool, lift, or other shop equipment

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Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET | DATE PREPARED 3/94

HI-TEMP PRODUCTS CO. 14936 GROVER ST. OMAHA, NEBRASKA 68144	EMERGENCY PHONE NUMBER 1-402-333-8323 1-402-359-5796	TELEPHONE NUMBER FOR INFORMATION 1-402-330-3344

1 PRODUCT NAME:
HT 0801 AKRYA Cut

+ HEALTH	1
^ FIRE	0
* REACTIVE	0

HAZARD RATING
0 – LEAST
1 – SLIGHT
2 – MODERATE
3 – SERIOUS
4 – SEVERE

2 PRECAUTIONARY STATEMENT FROM PRODUCT LABEL

WARNING

WEAR SAFETY GLASSES. MAY CAUSE EYE IRRITATION. IF EYE IRRITATION OCCURS, FLUSH EYES FOR 15 MINUTES WITH WATER. IF SWALLOWED, DO NOT INDUCE VOMITING. DRINK WATER OR MILK. IN EITHER CASE, CALL A PHYSICIAN IMMEDIATELY. REFER TO MSDS FOR CHEMICAL HAZARDOUS INFORMATION.

KEEP OUT OF THE REACH OF CHILDREN.

3 HAZARDOUS COMPONENTS OSHA – >

INGREDIENTS	%	CAS NO.	PEL/TLV a ppm	PEL/TLV 3 mg/m3	TWA a ppm	TWA 3 mg/m3	STEL a ppm	STEL 3 mg/m3	CEILING a ppm	CEILING 3 mg/m3
ISOPROPYL ALCOHOL	<3	67-63-0			400	983	500	1230		

4 PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	212° F	Specific Gravity (H20=1)	N/A
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (Air = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A
Solubility in water	MISCIBLE		
Appearance and Odor	PURPLE THICK EMULSION, BANANA ODOR		

5 Fire and Explosion Hazard Data

Flash Point	N/A	Flammable Limits	N/A	LEL N/A	UEL N/A
Extinguishing Media	WATER TO COOL DOWN CONTAINERS				
Special Fire Fighting Procedures	N/A	DIRECT FLAME FROM BUTANE TORCH			
WILL NOT IGNITE MATERIAL.					
Unusual Fire and Explosion Hazards	N/A				

6 HEALTH HAZARD INFORMATION – SIGNS AND SYMPTOMS OF EXPOSURE

SKIN: MAY IRRITATE SKIN, CAUSE LIGHT REDDENING IN PATIENTS WITH PREEXISTING SKIN DISORDERS.
EYES: MAY CAUSE EYE IRRITATION, BURNING, AND REDNESS.

SWALLOWING: MAY CAUSE MOUTH AND THROAT IRRITATION, BURNING, AND POSSIBLE ABDOMINAL DISCOMFORT OR NAUSEA.
BREATHING: PROLONGED BREATHING OF MIST MAY IRRITATE NASAL PASSAGES.

7 EMERGENCY AND FIRST AID PROCEDURES

ON SKIN: WASH WITH SOAP AND WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.

IN EYES: FLUSH EYES WITH PLENTY OF RUNNING WATER FOR 15 MINUTES, LIFTING EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

SWALLOWED: CALL A PHYSICIAN IMMEDIATELY. DO NOT INDUCE VOMITING. IF CONSCIOUS, DRINK PLENTY OF WATER OR MILK.

BREATHED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. SEEK IMMEDIATE MEDICAL ATTENTION.

8 TOXICITY DATA

ORAL: N/A | DERMAL: N/A

INHALATION: N/A

CARCINOGENICITY: NOT CONSIDERED TO BE A CARCINOGEN BY IARC.

NTP? N/A IARC MONOGRAPHS? N/A OSHA REGULATED? N/A

9 PERSONAL PROTECTION

VENTILATION: LOCAL OR MECHANICAL EXHAUST.
RESPIRATORY PROTECTION: IF NECESSARY, WEAR A PARTICLE MASK OR AN OSHA APPROVED MASK FOR MIST CONCENTRATIONS.
EYE PROTECTION: WEAR GOGGLES OR SAFETY GLASSES.
SKIN AND PROTECTIVE CLOTHING: WEAR RUBBER GLOVES.

10 HAZARDOUS REACTIVITY

STABILITY:	UNSTABLE?		CONDITIONS TO AVOID: N/A
	STABLE?	X	

INCOMPATIBILITY: N/A

HAZARDOUS BYPRODUCTS: N/A

HAZARDOUS POLYMERIZATION:	MAY OCCUR		CONDITIONS TO AVOID: N/A
	WILL NOT OCCUR	X	

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